



A Callender-Hamilton unit-construction hangar for the Air Ministry, before and after completion. Note the unobstructed door opening.

Callender's Cable and Construction Co., Ltd., Hamilton House, Victoria Embankment, London, E.C.4.—The Air Ministry has had eight of the Callender-Hamilton unit-construction hangars erected on various sites, and the necessary steelwork is now available on a commercial basis. The famous cable and pylon firm have placed the hangar on the market in conjunction with Painter Bros., Ltd., of Hereford, after exhaustive tests.

Some of the claims are: Lightness with low cost, standardisation of parts, ease of transport and erection, all connections by bolts, and all parts protected against corrosion by special hot-dip galvanising (as used on "grid" towers) after fabrication. The sliding doors system incorporated gives maximum clear opening, the foundations may or may not be set in concrete, and the roof, sides and doors can be covered with any form of material.

The steel framework consists of a series of box girder ribs comprising vertical stanchions supporting flat pitch roof girders of similar cross section. These girders give normal clear height of 25 feet on a span approximately 100 feet. Any length of hangar may, of course, be built by adding bays as required. The manufacturers, Painter Bros., are specialists in the fabrication and galvanising of light steel structures.

Cleveland Bridge and Engineering Co., Ltd., Darlington.—A firm which is responsible for such engineering masterpieces as the Lower Zambesi Bridge can have little to learn about large spans in steel; thus it may be rightly assumed that, apart from the example of the many Service hangars which they have already erected, the Cleveland Bridge Company can fulfil all requirements in airport hangar construction.

They design, construct and erect hangars from 50 ft. by 50 ft. upwards, and these are fitted with easily handled roller-bearing doors.

Diagrid Structures, Ltd., Horsferry House, Westminster, London, S.W.1.—The "Diagrid" system of construction has advantages of particular value for aircraft hangars. Briefly, "Diagrid" floors or roofs consist of two interlacing sets of diagonal beams, giving a structure of great strength and rigidity. Very large spans can be economically carried out, and the wide door openings required can be arranged without heavy girders.

Eclair Doors, Priory Works, Shirley, Bir-

mingham.—Orders for "Eclair" hangar and factory doors are now so large that Hawes and Snow, Ltd., have been forced to form a separate company under the above heading. While, twelve months ago, they thought that a door 40 ft. wide in one piece was something exceptional, they have since fitted numerous doors 150 ft. wide in one piece, and have now got out the designs for a single door 300 ft. wide in one piece.

Educational Supply Association, Ltd., Esavian House, 181, High Holborn, London, W.C.1.—Whilst the general principles of the Esavian folding and sliding doors, hangar and works doors remain the same, detailed improvements and developments are constantly taking place. A very important new design allows the doors to be opened from either end as well as from the middle. The importance of this will be realised especially by the heating engineer, as no longer is it necessary to open all one side to get an aeroplane out from the end.

Top and bottom movements on the sliding upright can be lubricated by means of group lubrication, with the grease nipples mounted on a battery plate, conveniently located on the sliding upright for easy operations. Oil-less bushes are used for all important bearings not fed by the group lubrication. The weight of the doors is carried on a bottom movement running on a "T" track, and thus there is no weight carried by the structure of the building—a great point in the economy of building costs.

The electrical apparatus for opening and closing the doors can be arranged in such

a way as to meet the requirements of the Home Office, and can be used without danger of sparking on doors enclosing "dope" shops and other premises where highly inflammable material is stored. Where fitted, the electrical winding gear will open or close doors 200 ft. wide in under 60 seconds.

En-Tout Cas Co., Ltd., Aerodrome buildings.—See under Aerodrome preparation.

Gibson and Co., Ltd., Arthur L., Radnor Works, Strawberry Vale, Twickenham.—Kinnear patent steel rolling shutters are particularly suitable for inclusion in a variety of aerodrome buildings.

Sufficient testimony to their reliability and efficiency under arduous conditions is the fact that they are used for the hangars of all aircraft carriers of the Fleet Air Arm, as well as for the deck hangars of aircraft-carrying cruisers.

Horseley Bridge and Thos. Piggott, Ltd., Tipton, Staffs.—This firm's "Lamella" roofing construction provides a clear and uninterrupted floor space. Provision is made for future extension and unit construction lends itself to easy transport and speedy erection, mainly by unskilled labour.

The shape of the pressed-steel section is developed to obtain the maximum rigidity. The whole structure is built on the sound principle of the arch, and its strength is stated to be exceptional for the weight of steel employed.

The units are light in weight and nest together compactly for ease and economy in transport.

Law, Ltd., A. and A. J., 132, Kingston Road, Merton, London, S.W.19.—This firm specialise in steel- and timber-framed hangars and workshops, with brick, asbestos or corrugated iron sidewalls and asbestos or corrugated iron roofing. Their specially designed hangar doors are claimed to be particularly easy to operate and are of pleasing appearance.

For extra-large span hangars the firm have a copyright design (type LS), as supplied to Gravesend and Reading aerodromes.

Lindsay-Neale Aviation Co., Hangars.—See under Fire Fighting and Crash Equipment.

Lysaght, Ltd., John, Bristol, specialists in constructional steelwork, have erected a large number of steel structures for the housing and manufacture of aircraft. They were responsible for considerable extensions at the Bristol Aeroplane Company's works.

Nissen Buildings, Ltd., Rye House, Hoddesdon, Herts.—The name of Nissen is one of well-remembered association where metal buildings are concerned, and the firm have had very long experience of the adaptation of their distinctive system to airport needs.

Their latest departure is the design of air-raid protection buildings of many types.

Wright, Anderson and Co., Ltd., Gateshead-on-Tyne.—Experts in constructional steelwork, this company has erected both large and small steel-framed buildings for a great variety of purposes at home and abroad.

They are well fitted to undertake hangar construction, and their catalogue illustrates a number of such structures—one, with 700 tons of steelwork, has a 160 ft. clear span and is 40 ft. high to the eaves; another is part of a group of hangars totalling 3,500 tons of steelwork. Among recent contracts were hangars for the Newcastle Municipal Airport, Woollington.



A Lloyds gang mower at work on the Westland aerodrome, Yeovil.